

Practice 1.3: Modelling and basics

Artificial Intelligence

G.Guérard

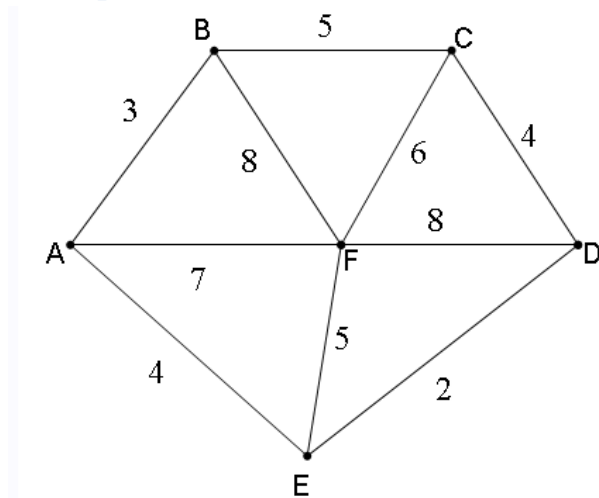
Kruskal's Algorithm

We consider a weighted connected graph G With n vertices. Kruskal's algorithm finds a minimum spanning tree of G .

The main steps of the Kruskal's Algorithm are as follows:

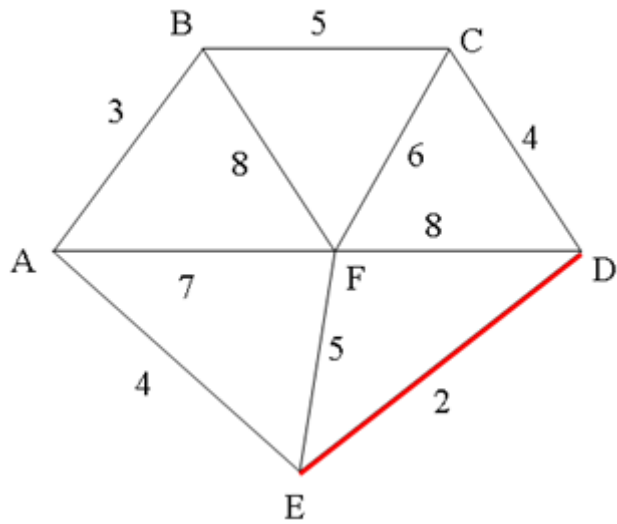
1. Arrange the edges by weight: least weight first and heaviest last.
2. Choose the lightest not examined edge from the diagram. Add this chosen edge to the tree, only if doing so will not make a cycle.
3. Stop the process whenever $n - 1$ edges have been added to the tree.

Example



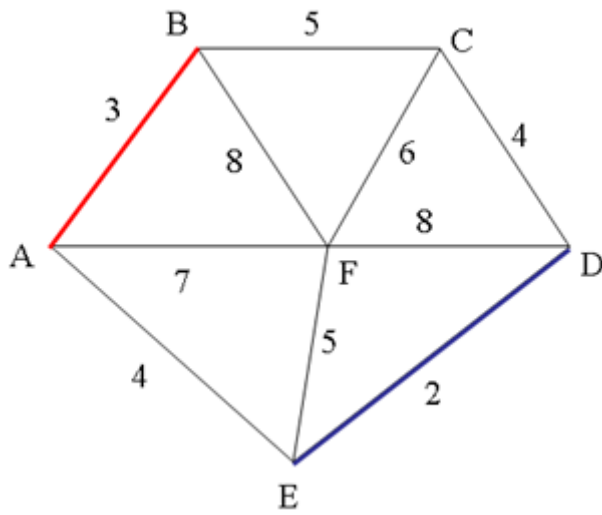
The list of edges in order of their weights or sizes would be as follows:

Edge	ED	AB	CD	AE	BC	EF	CF	AF	BF	FD
Weight	2	3	4	4	5	5	6	7	8	8



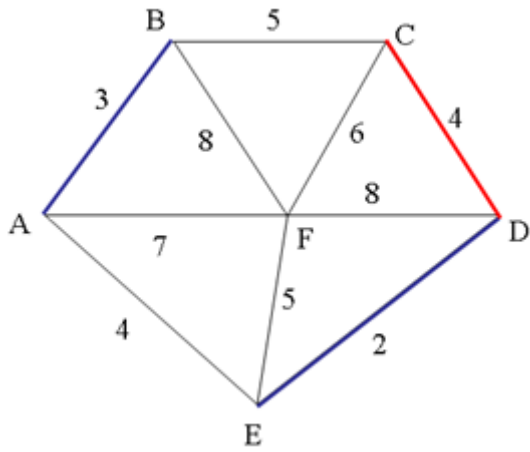
No cycle

Edge	ED	AB	CD	AE	BC	EF	CF	AF	BF	FD
Weight	2	3	4	4	5	5	6	7	8	8



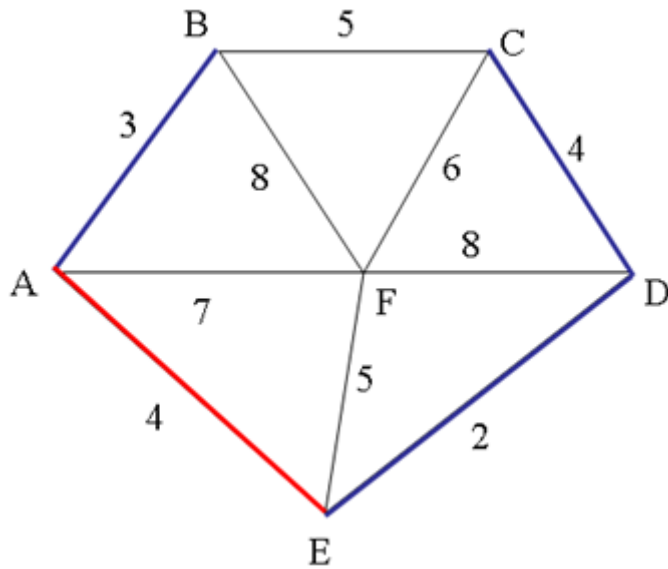
No cycle

Edge	ED	AB	CD	AE	BC	EF	CF	AF	BF	FD
Weight	2	3	4	4	5	5	6	7	8	8



No cycle

Edge	ED	AB	CD	AE	BC	EF	CF	AF	BF	FD
Weight	2	3	4	4	5	5	6	7	8	8

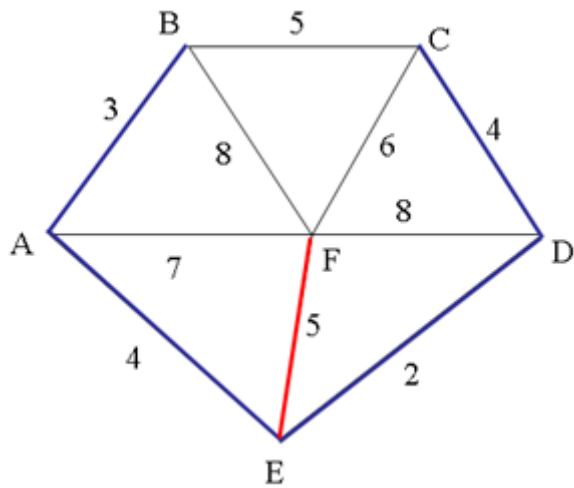


No cycle

Edge	ED	AB	CD	AE	BC	EF	CF	AF	BF	FD
Weight	2	3	4	4	5	5	6	7	8	8

Edge	ED	AB	CD	AE	BC	EF	CF	AF	BF	FD
Weight	2	3	4	4	5	5	6	7	8	8

→ Cycle detected: do not use BC



No cycle, n-1 edge -> END

Edge	ED	AB	CD	AE	BC	EF	CF	AF	BF	FD
Weight	2	3	4	4	5	5	6	7	8	8

Exercise

Find a MST on these graphs:

